FEDERAL PUBLIC SERVICE COMMISSION

COMPETITIVE EXAMINATION-2024 FOR RECRUITMENT

TO POSTS IN BS-17 UNDER THE FEDERAL GOVERNMENT

Roll Number

COMPUTER SCIENCE PAPER-I

TIME ALLOWED: THREE HOURS **PART-I(MCQS): MAXIMUM 30 MINUTES**	**PART-I (MCQS) MAXIMUM MARKS = 20** **PART-II MAXIMUM MARKS = 80**

NOTE: (i) **Part-II** is to be attempted on the separate **Answer Book.**

(ii) Attempt **ONLY FOUR** questions from **PART-II. ALL** questions carry **EQUAL** marks.

(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.

(iv) Candidate must write Q. No. in the Answer Book in accordance with Q. No. in the Q. Paper.

(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.

(vi) Extra attempt of any question or any part of the attempted question will not be considered.

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Roll Number

COMPUTER SCIENCE, PAPER-I

TIME ALLOWED: THREE HOURS **PART-I (MCQs) : MAXIMUM 30 MINUTES**	**(PART-I MCQs) MAXIMUM MARKS: 20** **(PART-II) MAXIMUM MARKS: 80**

NOTE: (i) First attempt **PART-I (MCQs)** on separate **OMR Answer Sheet** which shall be taken back after **30 minutes.**
(ii) Overwriting/cutting of the options/answers will not be given credit.
(iii) There is **no negative** marking. All MCQs must be attempted.

PART-I (MCQs)(COMPULSORY)

Q.1. (i) Select the best option/answer and fill in the appropriate Box ■ on the **OMR Answer Sheet.(20x1=20)**
(ii) Answers given anywhere else, other than OMR Answer Sheet, will not be considered.

1. **Which of the following ports is used to connect external devices such as printers, scanners, and cameras to a computer?** (A) USB (Universal Serial Bus) (B) HDMI (High-Definition Multimedia Interface) (C) VGA (Video Graphics Array) (D) None of these
2. **Which type of monitor technology offers the widest viewing angles and accurate color reproduction?** (A) CRT (Cathode Ray Tube) (B) OLED (Organic Light-Emitting Diode) (C) LCD (Liquid Crystal Display) (D) None of these
3. **Which component is responsible for providing power supply to all other components in a computer system?** (A) Power Supply Unit (PSU) (B) Central Processing Unit (CPU) (C) Motherboard (D) None of these
4. **What is an example of system software from the list below?** (A) Windows (B) Google Chrome (C) Adobe Photoshop (D) None of these
5. **Which of the following is NOT an agile software development methodology?** (A) Scrum (B) Waterfall (C) Kanban (D) None of these
6. **Which was the first purely object-oriented programming language developed?** (A) Java (B) C++ (C) SmallTalk (D) None of these
7. **Which language does not allow for inheritance in all four forms?** (A) Kotlin (B) Java (C) C++ (D) None of these
8. **Which programming language allows for polymorphism but not classes?** (A) C++ programming language (B) Java programming language (C) Ada programming language (D) None of these
9. **Which of the following is considered as the world's first antivirus program?** (A) Tinkered (B) Reaper (C) Creeper (D) None of these
10. **If an employee requests root access to a UNIX system in which you serve as the administrator, you shouldn't provide them access or this authority unless their job necessitates certain rights and privileges. Which cyber security notion may it be seen as an excellent example of:** (A) Least privileges (B) Separation of Privileges (C) Open Design (D) None of these
11. **After a certain amount of time, say thirty minutes, the online application, similar to banking websites, should prompt users to log in again. Which cyber security concept may it be seen as a prime example of:** (A) Compromise recording (B) Psychological acceptability (C) Complete mediation (D) None of these
12. **Which of the following malware types does not infect others and duplicate or clone itself?** (A) Rootkits (B) Trojans (C) Worms (D) None of these
13. **When compiled, which of the following class of statement often yields no executable code?** (A) Assignment statement (B) Structural statements (C) Input and output statements (D) None of these
14. **A high-level language compiler that runs on one computer and generates code for another is known as:** (A) One pass compiler (B) Multipass compiler (C) Cross compiler (D) None of these
15. **Compiler can check ____ error.** (A) Syntax (B) Content (C) Logical (D) None of these
16. **Select the correct output of the following code.**

```
#include <stdio.h>
int main()
{
  int arr[5]={10,20,30,40,50};
  printf("%d", arr[5]);

  return 0;
}
```

(A) Garbage value (B) 20 (C) 30 (D) None of these

17. **When we attempt to add the eleventh element to a stack with a size of 10, we encounter a circumstance known as:**
(A) Garbage collection (B) Underflow (C) Overflow (D) None of these

18. **Regarding Binary Trees, which of the following is true?**
(A) Every binary tree has two states: full and complete.
(B) Every binary tree that is full is also a complete binary tree.
(C) All complete binary trees are likewise full binary trees.
(D) None of these

19. **What is the name of a linear collection of data components where the linear node is provided by a pointer?**
(A) Linked list (B) Primitive List (C) Node list (D) None of these

20. **How much time would it take to add an element to the linked list asymptotically?**
(A) O (1) (B) O (n) (C) O (n^2) (D) None of these

PART-II

NOTE: (i) **Part-II** is to be attempted on the separate **Answer Book.**
(ii) Attempt **ONLY FOUR** questions from **PART-II**, by selecting **TWO** questions from **EACH SECTION**. **ALL** questions carry **EQUAL** marks.
(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.
(iv) Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.
(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.
(vi) Extra attempt of any question or any part of the question will not be considered.

SECTION-A

Q. No. 2 **(a)** Discuss the future of Information Technology (IT) in Pakistan and its huge impact on all our daily lives. **(6)**
(b) Discuss the difference between a computer virus a trojan and a worm? **(6)**
(c) Discuss the pros and cons of LaTeX in comparison to other document processors. **(8)**

Q. No. 3 **(a)** Write a program that prompts the user to enter a letter grade A, B, C, D, or F and displays its corresponding numeric value 4, 3, 2, 1, or 0. **(6)**
(b) Write pseudocode OR C-language script for the following expression. **(6)**

$$\vec{a} \cdot \vec{b} = \sum_{i=1}^{n} a_i b_i = a_1 b_1 + a_2 b_2 + \ldots + a_n b_n$$

(c) Write a version of Breadth First Search (BFS) that finds the distances from the start node to each of the others, rather than the actual paths. **(8)**

Q. No. 4 **(a)** Write a program that displays the area and perimeter of a rectangle with the width of 4.5 and height of 7.9 using the following formula: area = width * height. **(6)**
(b) Write a program that reads a Celsius degree from the console, then converts it to Fahrenheit and displays the result. The formula for the conversion is as follows: Fahrenheit = (9 / 5) * Celsius + 32. **(6)**
(c) Write a program that prompts the user to enter the month and year and displays the number of days in the month. For example, if the user entered month 2 and year 2024, the program should display that February 2024 had 29 days. If the user entered month 3 and year 2015, the program should display that March 2015 had 31 days. **(8)**

SECTION-B

Q. No. 5 **(a)** Show the output of the following code? **(6)**

```
public class Test {
public static void main(String[] args) {
Double x = 3.5;
System.out.println(x.intValue());
System.out.println(x.compareTo(4.5));
}
}
```

(b) Illustrate the difference between overriding and overloading by the piece of pseudocode or program. **(6)**

(c) How do you prevent a class from being extended? How do you prevent a method from being overridden? Exemplify with simple piece of code. **(8)**

Q. No. 6 **(a)** For the following data sets, which sorting algorithms would work well, and which would not? **(8)**

a. 10 floating-point values
b. 1,000 integers
c. 1,000 names
d. 100,000 integers with values between 0 and 1,000
e. 100,000 integers with values between 0 and 1 billion
f. 100,000 names
g. 1 million floating-point values
h. 1 million names
i. 1 million integers with uniform distribution
j. 1 million integers with non-uniform distribution

(b) Write an algorithm that implements binary search recursively. Does this version have any advantages or disadvantages compared to the non-recursive version? **(6)**

(c) Write an algorithm that deletes a specified cell from a doubly linked list. Draw a picture that shows the process graphically. **(6)**

Q. No. 7 **(a)** Discuss the phases of project management including conception and initiation, project planning, project execution, performance/monitoring, and project close. **(6)**

(b) What are the different types of test design techniques? When would you use these types of test design techniques? **(6)**

(c) Exemplify the difference between Quality Assurance, Quality Control, and Testing? **(8)**

Q. No. 8 Write Regular Expression(s) for the following **(5 each)** **(20)**

I. For date Format of standard e.g. (10.03.2024 | 12/30/2023| 01/01/2022)
II. Write a Regular Expression that will match URL e.g. (http://example.edu.pk)
III. Write a Regular Expression that will match an IP address. e.g. 192.168.0.1
IV. Write a Regular Expression that will match an email address. e.g. (abc@example.com)

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